The Power and Efficiency of Advanced Software and Parallel Processing

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Abstract

Real-time simulation of flexible and articulating systems is difficult because of the computational burden of the time varying calculations. The mobile servicing system of the NASA Space Station Freedom will handle heavy payloads by local arm manipulations and by translating along the spline of the Station. Because such motion can be very disruptive to the attitude of the Space Station, it is crucial to have real-time simulation available.

To enable such a simulation to be of high fidelity and to be able to be hosted on a modest computer, special care must be made in formulating the structural dynamics. frontal solution algorithms save considerable time in performing these calculations. In addition, it is necessary to take advantage of parallel processing, and in particular, certain powerful processors available at modest cost. It is crucial that both the algorithm and the parallel processing be compatible to take full advantage of both. an approach is offered which will result in high fidelity, real-time simulation for flexible, articulating systems such as the space Station remote servicing system.